FTE 2.0 - COMMISSIONING WITH CAREL SUPERVISOR

Rev.	*Date*	*Modification*
0	10/03/17	First Release

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Contents

Commissioning in field

1. FTE pre-commissioning from remote (2 hours required)

This part can be done from remote or on field:

	Action	How to attachment
1	Verify the system requirements	SE-TS027R00
2	Import device model	SE-TS031R00-ATT B
3	Enable “floating suction” optimization in pRack	SE-TS031R00-ATT C
4	Activate the function “floating suction”	SE-TS031R00-ATT D
5	Implement (but do not activate) the rules of the FTE2.0	SE-TS031R00-ATT E

2. FTE commissioning in field (8 hours required)

This part has to be done in field with the FTE mechanically excluded (by-passed) from the system and empty (void):

1. Verify the status of the system, which specific focus on:
    a. Verify the oil level inside the oil reservoir;
    b. Verify the level of the liquid receiver;
    c. Verify the alarm on the system;
    d. Verify that the pressure switch for the LT compressor (discharge pressure) is pre-set at 38bar (+ 4,3 °C).
2. Switch ON the FTE2.0 controller;
3. If present, check if the probe AI2 is enable in the FTE2.0 controller: A2En = 1;
4. Enable se advanced function of FTE2.0: AdEn = 1;
5. Change the value of Pday:
    a. = 4015 means infinite contract with EPTA SERVICE;
    b. = between 1 and 4014 means the exact number of contract days with EPTA SERVICE;

   c. = 0 means no contract with EPTA SERVICE;
6. Put in pressure the receiver proceeding as follow:
   a. Open valve 1a
   b. Then open valve 2a and at the same time close valve 3a before start the overfeeding
   c. Put in pressure the FTE (only from gas line). Open slowly the valve to avoid dry ice formation;
   d. Excite the solenoid valves to break the void also in the liquid line between 2L and the solenoids;
7. After breaking the void, verify the value of pressure probe P1 to be sure that there are not leakages through the check valves (if installed) or the ball valves (closed position). The value that can be expected is the value of the suction pressure read in the pack main controller (the same pressure level of the suction line shall be expected, if not verify the check-valve of the FTE for leakage);

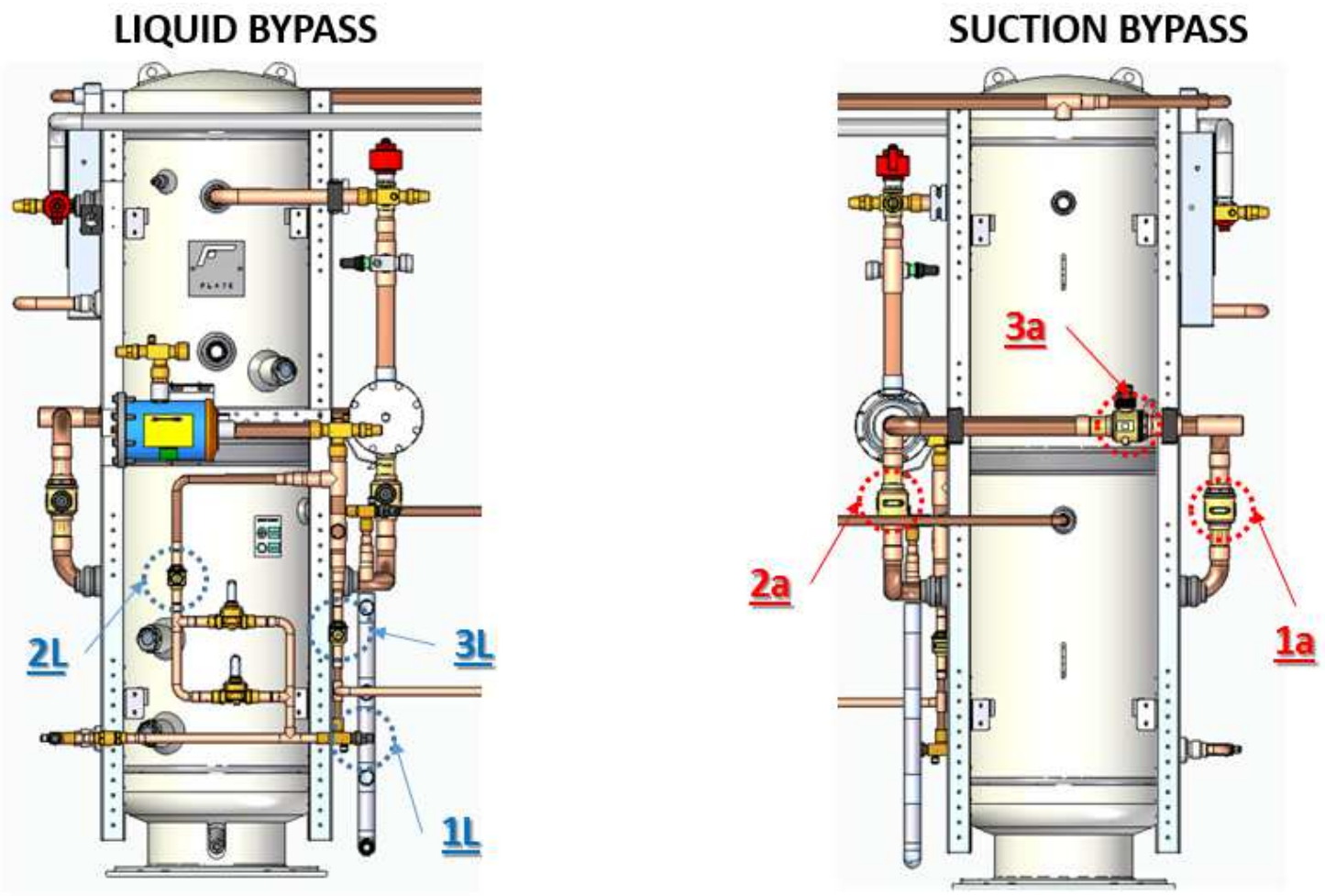

Figure 1 - Layout concept with by-pass for FTE connection

8. Electrically disconnect the solenoids (closed), open valve 2L and verify the value of pressure probe P1 to be sure that there are not leakages through the solenoids (the same pressure level of the suction line shall be expected, if not check the solenoid valves);
9. Reconnect the solenoids;
10. Open 1L and 2L and than close 3L (not vice versa);
11. Start to overfeed the system:
    a. For each MT loads (cabinet and cold rooms) change the parameter MOP (maximum operating pressure) threshold to +1°C;
    b. Increase the pressure switch for the MT compressors (suction pressure) at 41 bar (+ 7,2 °C).
    c. For each MT loads put the parameter low superheating (P7) = -1K;
    d. Decrease gradually the superheating of the MT loads:
        i. Set the SH=7K, wait 10 minutes;
        ii. Set the SH=5K, wait 10 minutes;
        iii. Set the SH=1K.
12. Activate the FTE system manager rules (to decrease and increase SH);
13. Gradually charge the system with additional refrigerant:
    a. Wait the low liquid sensor or the sight glass of the receiver highlight the fact that there is no liquid;
    b. Start to add refrigerant: start with 10kg each 10 minutes (for the max of one cylinder);
    c. Wait 30 minutes and check the status of the FTE liquid sensor:
        i. If MLL is activated, stop adding refrigerant;
        ii. Otherwise check the LLL on the receiver: if refrigerant is missing, adds more refrigerant.

Repeat the procedure until this equilibrium is obtained: the receiver doesn't show low liquid alarm and the level of liquid is between 30% and 50%.

As general rules it has to be expected an additional refrigerant charge between 30% and 50% of the volume of the FTE.

3. Post-commissioning (1 hours required)

This part shall be done in field with the FTE activated and running:

- Enable the FTE2.0 controller from “Site configuration” menu;
- Increase the main liquid receiver pressure set-point (parameter *L1 - RPRV valve regulation set point)* to 36bar (or up to 37bar if receiver pressure is smooth and stable);
- Schedule of the defrost must be done taking into account the MT and LT loads:
  - LT defrost must not be scheduled after a MT defrost;
- Starting open degree of the loads expansion valve (*cP1 parameter*) shall be increased to accelerate the evaporator overfeeding (suggested value: 60% starting opening degree);
- Set the gas cooler minimum condensing pressure (*HPV_Min_Setp_Work*) at 45bar (instead of the standard 40bar). Change the set-point only if the evaporation temperature of the MT cabinet is above -5°C (to maintain the compressors inside the envelope);
- Increase the liquid injection set-point (AKV intervention) values from 20K to 30K;
- Reduce the parameter of the hot gas injection (suggested value: 5K with 3K differential);
- Check the oil level in the reservoir and eventually add oil to the system if missing. It is suggested to verify the status of the oil reservoir after one week;
- Decrease the alarm of low superheat in suction line to 3K. Set the delay of alarm to 60 seconds;

FTE 2.0 - COMMISSIONING WITH CAREL SUPERVISOR: IMPORT DEVICE MODEL

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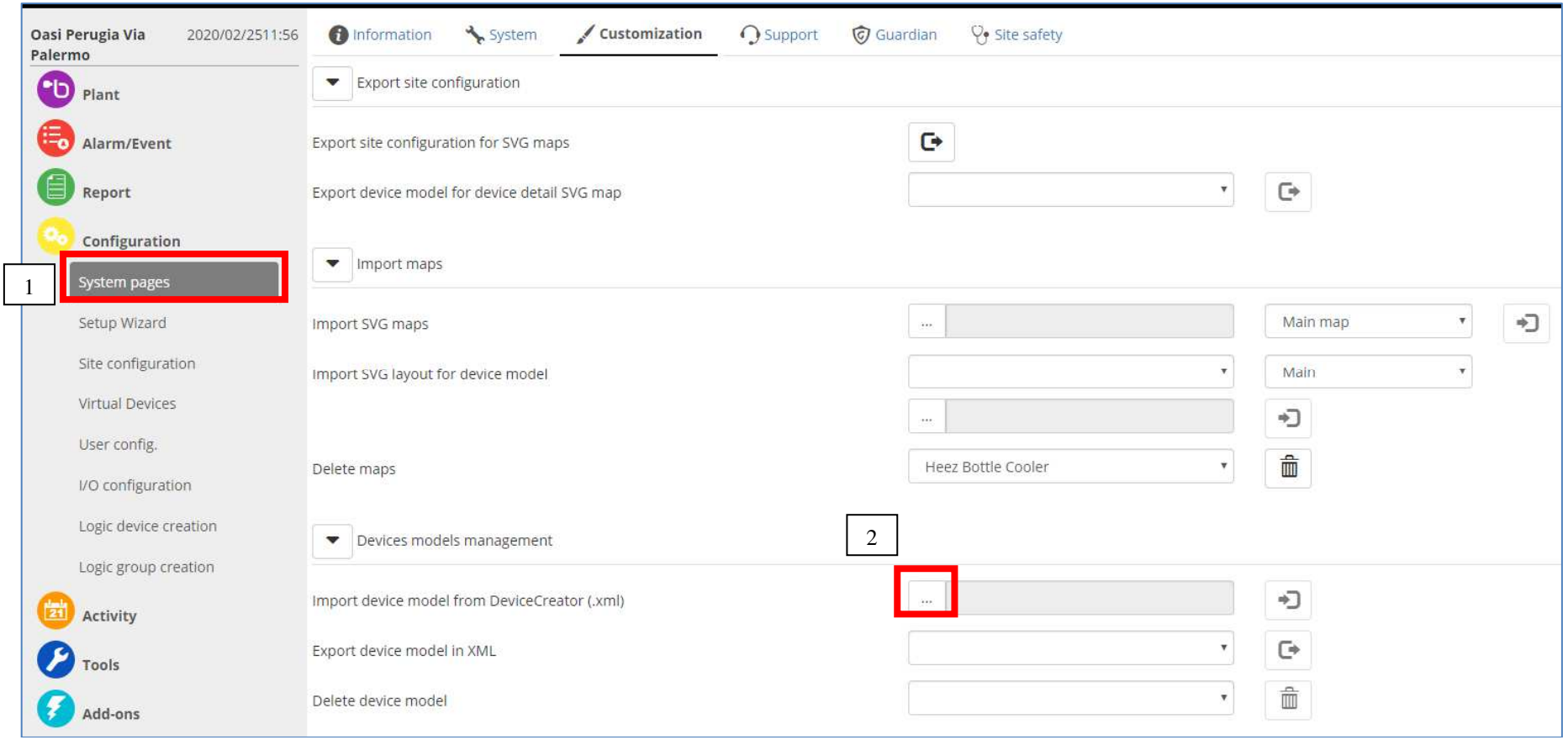
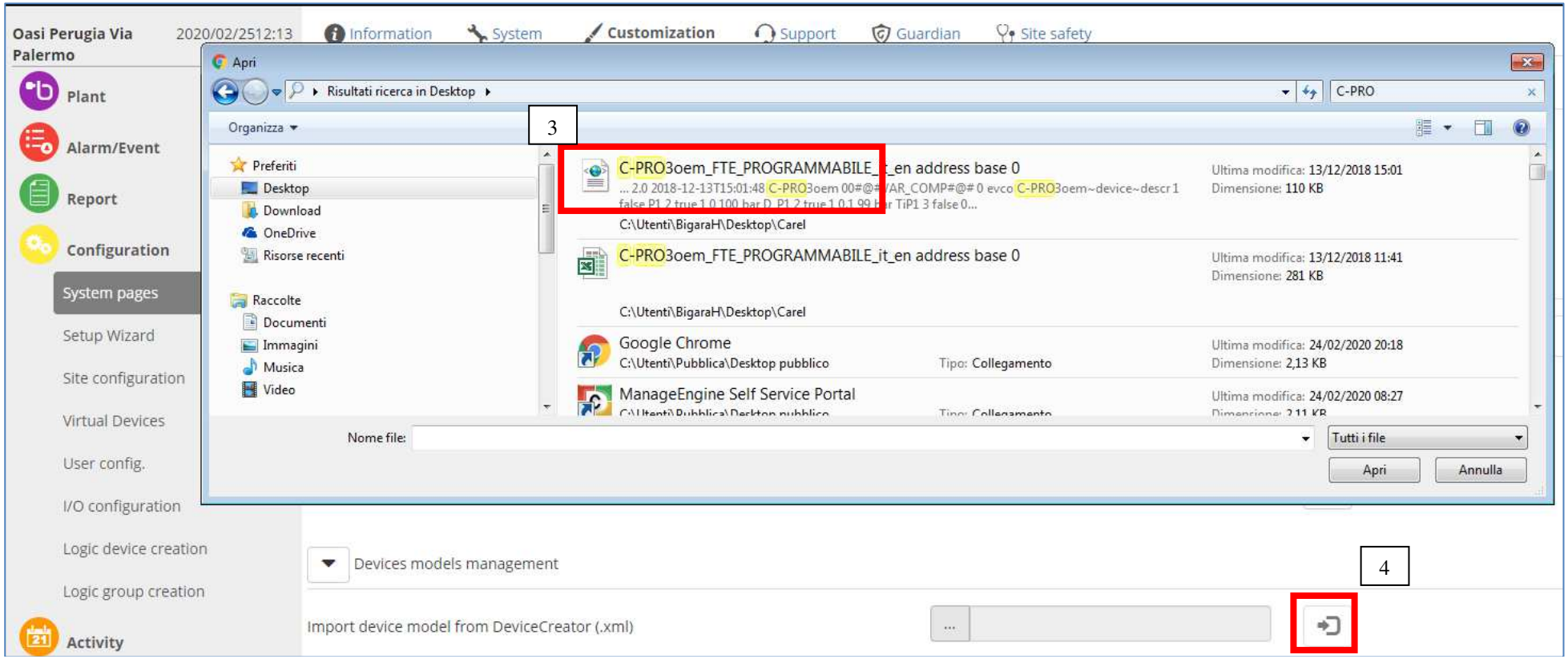
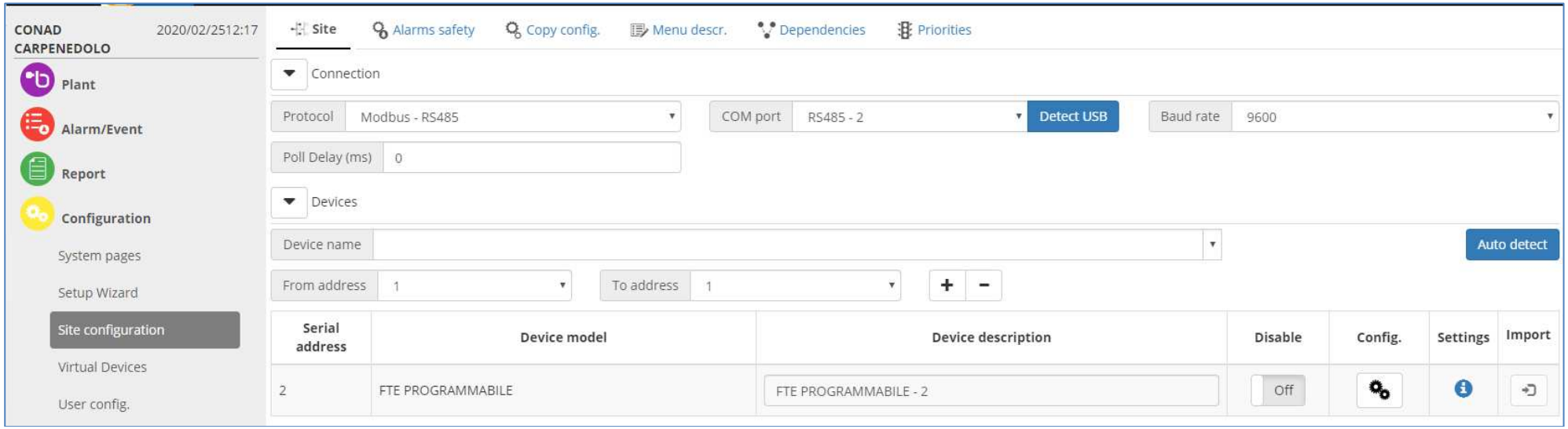
How import model for FTE2.0 in Boss:



Select the file and imported:



Create the dedicated Modbus line for FTE2.0 and import the device previously imported:



➔ ***<u>CONTACT SYSTEM ENGINEERING DEPT. FOR THE ".xlm" DEVICE MODEL.</u>***

FTE 2.0 - COMMISSIONING WITH CAREL SUPERVISOR: ENABLE “FLOATING SUCTION” IN PRACK

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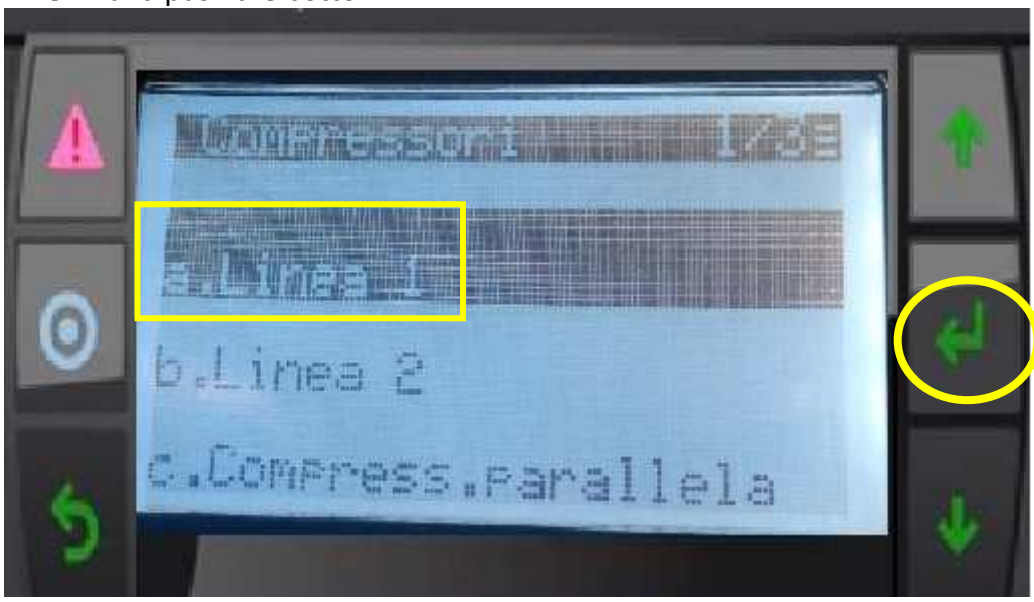
1. This procedure must be done in front of the pRack in field

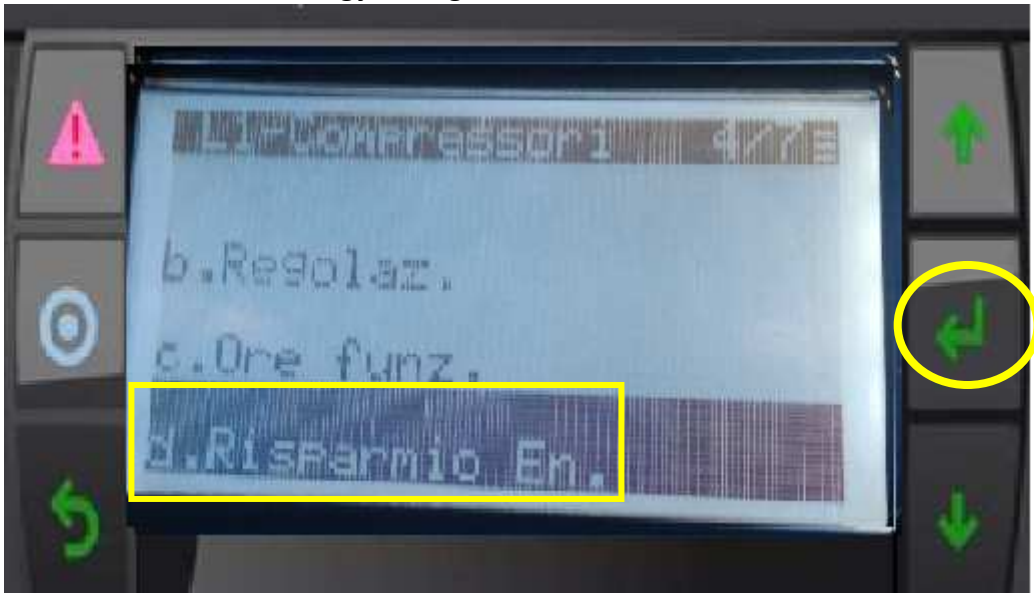
2. From the main menu of pRack push the bottom:

3. Choose the menu ***“C.Compressors”*** and push bottom:

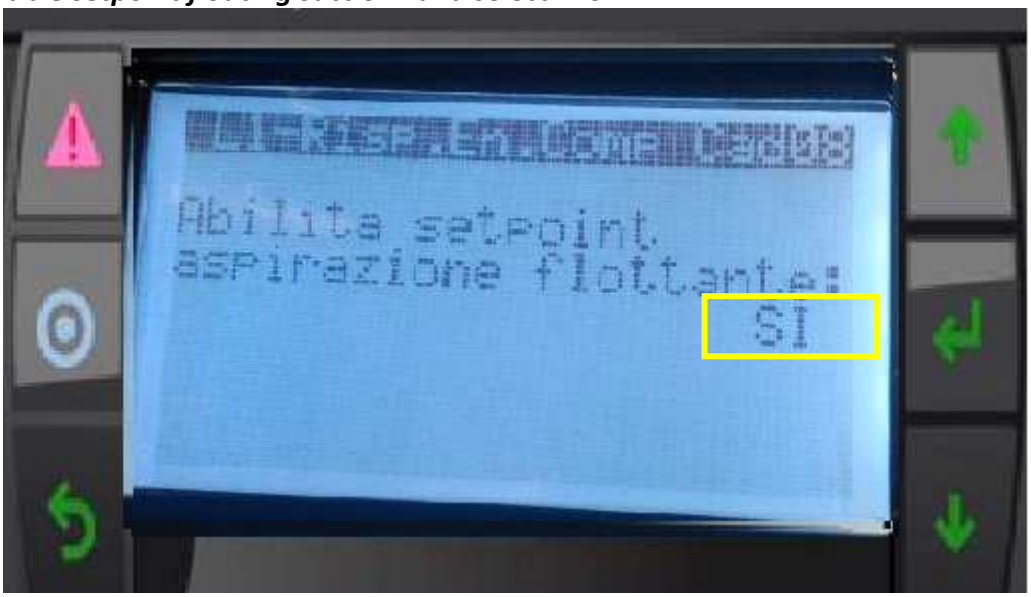
4. Select ***“a.Line 1”*** and push the bottom:



5. Down with the arrow until ***“d. Energy saving”*** and enter in the menu:



6. Serch ***“Enable setpoint floating suction”*** and select **YES**:



7. Verify the correspondence on port:

Check. Port BMS if external RS485 is in slot BMS card, port BMS2 if RS485 is inside de PVPRO.

8. Repeat the procedure for ***“Line 2”***

FTE 2.0 - COMMISSIONING WITH CAREL SUPERVISOR: ACTIVATE THE FUNCTION “FLOATING SUCTION”

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1. From the menu **"Plant"** click on **"Devices"**. Select **"pRack Transcritical".**
   In **tab "Parameters"** select **"All parameters"** and for the Transcritical Pack change the following parameter with the values below:

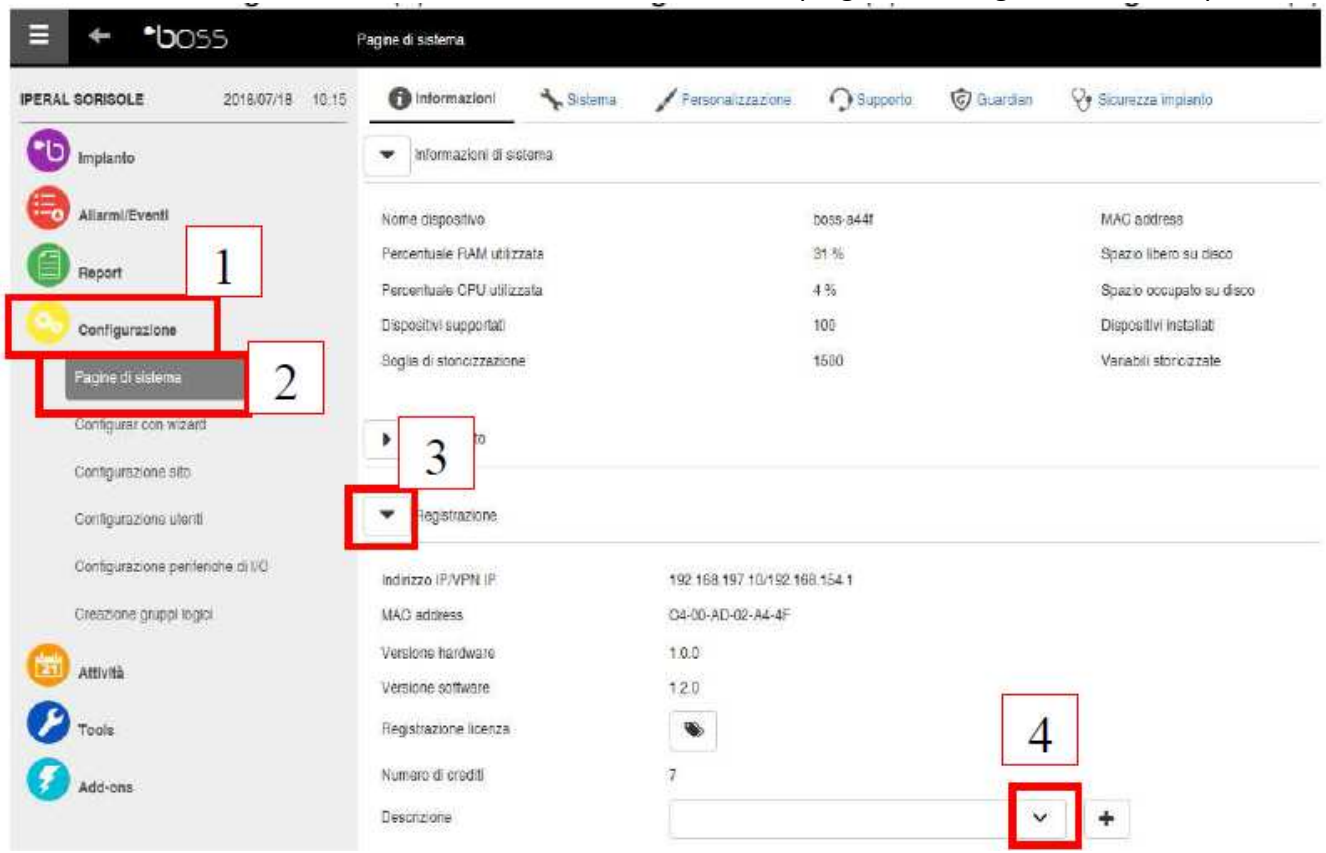
	VALUE	NAME OF PARAMETER	DESCRIPTION OF THE PARAMETER
L1	**1 (*)**	Float_Setp_Comp_En_L1	L1 - Enable floating suction setpoint
	0,1	Float_Setp_Comp_Max_Delta_L1	L1 - Maximum delta admitted for floating suction
	1	Float_Setp_Comp_Reduce_Time_L1	L1 - Floating suction setpoint time reduction
	26,5	Comp_Float_Min_Setpoint_L1	L1 - Floating suction minimum setpoint
	30	Comp_Float_Max_Setpoint_L1	L1 - Floating suction maximum setpoint

L2	**1 (*)**	Float_Setp_Comp_En_L2	L2 - Enable floating suction setpoint
	0,1	Float_Setp_Comp_Max_Delta_L2	L2 - Maximum delta admitted for floating suction
	1	Float_Setp_Comp_Reduce_Time_L2	L2 - Floating suction setpoint time reduction
	12	Comp_Float_Min_Setpoint_L2	L2 - Floating suction minimum setpoint
	14	Comp_Float_Max_Setpoint_L2	L2 - Floating suction maximum setpoint

(*) Attention: when the floating suction is enable, if in the pRack is set the correct door (see att C), the suction set-points on pack goes immediately to the values set in parameter:

- **"L1 - Floating suction minimum setpoint" for MT e**
- **"L2 - Floating suction minimum setpoint" for LT.**

2. For **BOSS** follow the instruction below in order to activate the plug-in “floating suction” on Supervisor



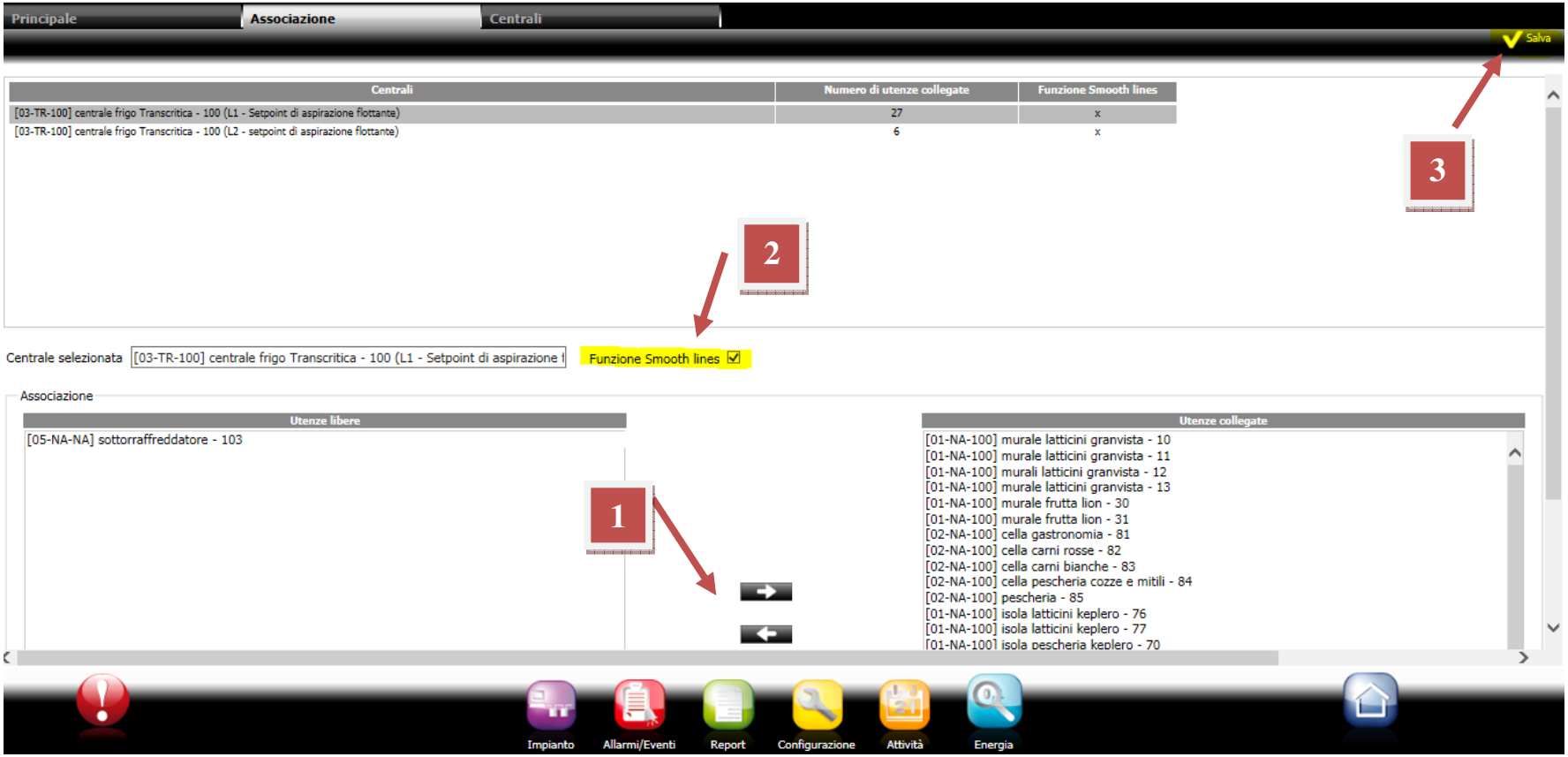
In point 4. choose “Floating suction”.

3. Log-in and log-out.
   - On BOSS the floating suction will be in “Add-ons” menu
   - On PVpro the floating suction will be in “Energy” menu

4. On **“Floating Suction Pressure”** and then **tab “Racks”**
   Flag “Enable” for L1 AND for L2.
   Then save.

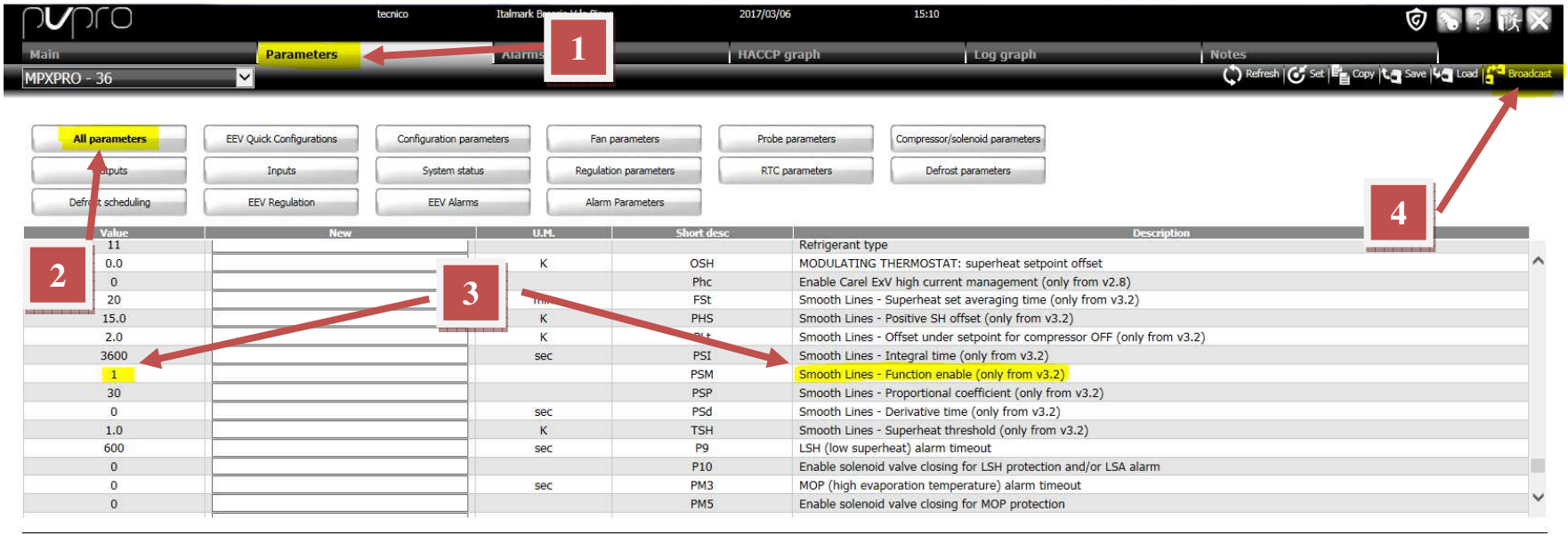
5. From the menu **“Energy”** click on **“Floating Suction Pressure”** and then **tab “Association”**.
   Select the concerned cabinet from “All Utilities” to “Rack Utilities” for L1.
   Flag “Smooth lines control” and then save.
   Repeat the same operation for L2.

   WARNING. The Smooth lines control can be activated only for MXPRO version 3.2 and later. If there are devices with older version, exclude them to the list for floating suction pressure.



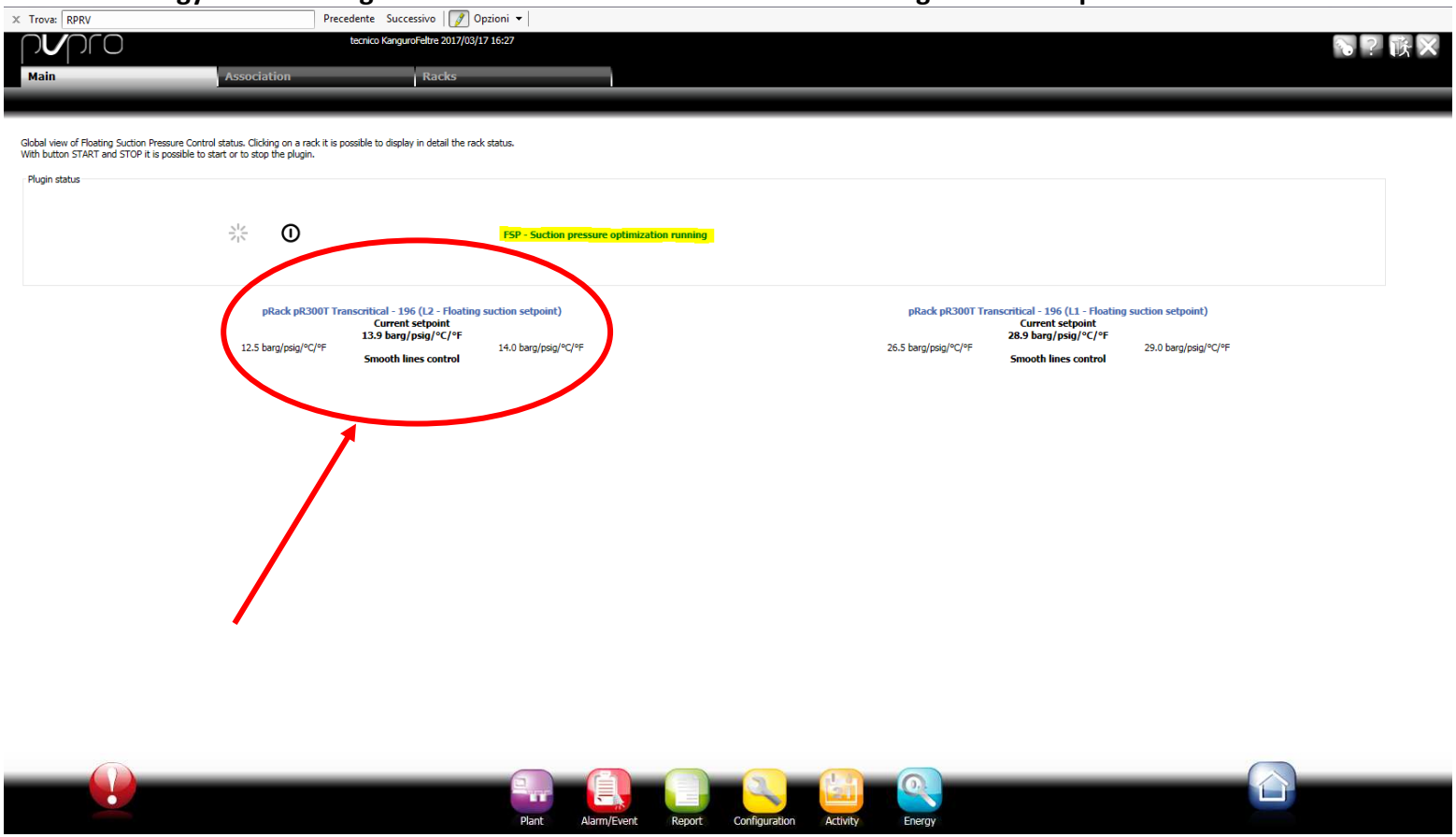
6. From the menu **“Plant”** click on **“Devices”** and choose one of the interested cabinets.
   Select the menu **“Parameters”**, then **“All parameters”**.
   Enable the parameter “Smooth Lines – Function enable (only from v3.2)” with the value “1”.
   Click on **“Broadcast”** to extend that value to the all the other interested cabinet.

ENABLE THE PSM PARAMETER ON THE CABINETS AND COLD ROOMWHEN THE FLOATING SUCTION WILL BE ENABLE: THE DAY OF THE COMMISSIONG.

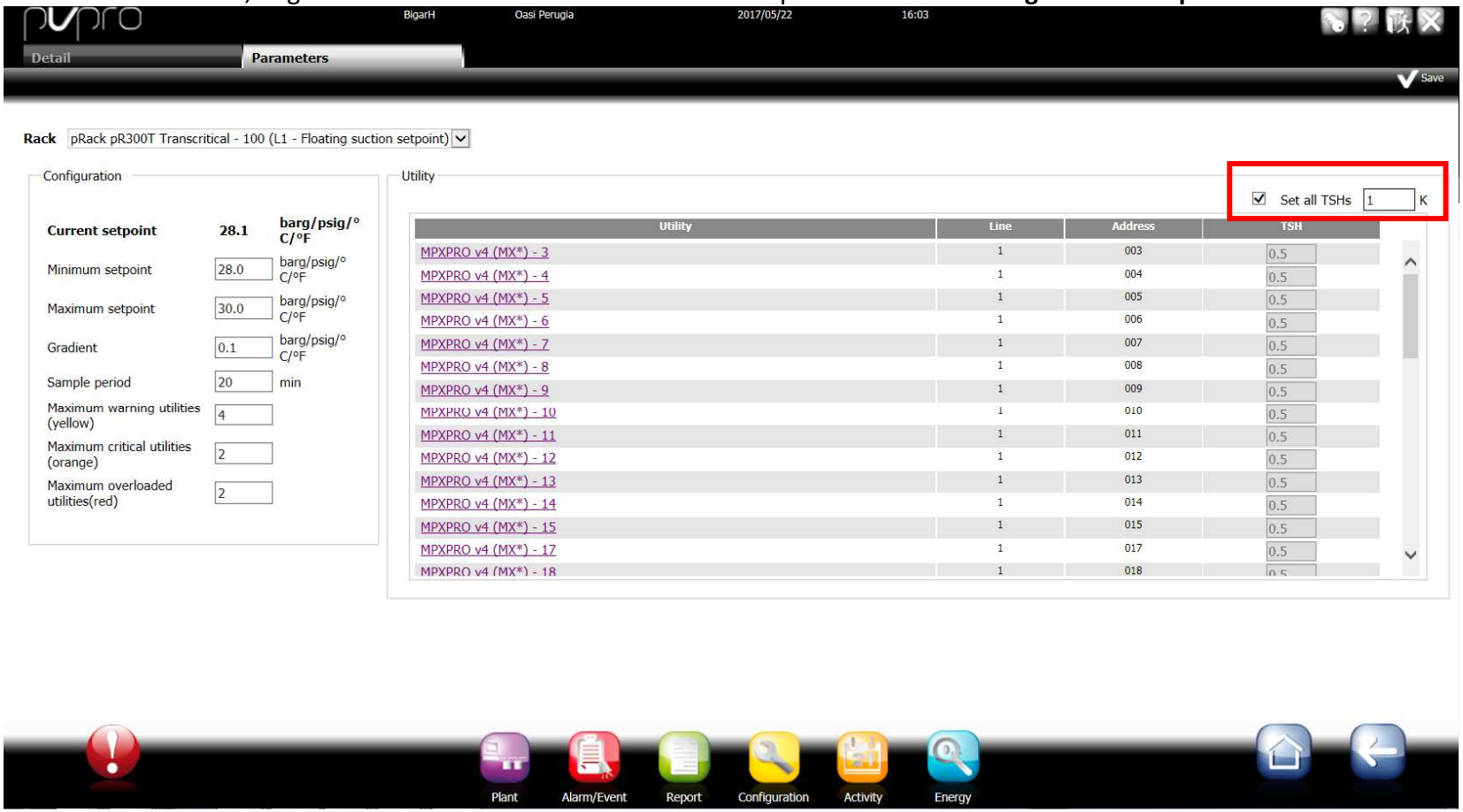


Value	New	U.M.	Short desc	Description
11				Refrigerant type
0.0		K	OSH	MODULATING THERMOSTAT: superheat setpoint offset
0			Phc	Enable Carel ExV high current management (only from v2.8)
20			FSt	Smooth Lines - Superheat set averaging time (only from v3.2)
15.0		K	PHS	Smooth Lines - Positive SH offset (only from v3.2)
2.0		K	PLt	Smooth Lines - Offset under setpoint for compressor OFF (only from v3.2)
3600		sec	PSI	Smooth Lines - Integral time (only from v3.2)
1			PSM	Smooth Lines - Function enable (only from v3.2)
30			PSP	Smooth Lines - Proportional coefficient (only from v3.2)
0		sec	PSd	Smooth Lines - Derivative time (only from v3.2)
1.0		K	TSH	Smooth Lines - Superheat threshold (only from v3.2)
600		sec	P9	LSH (low superheat) alarm timeout
0			P10	Enable solenoid valve closing for LSH protection and/or LSA alarm
0		sec	PM3	MOP (high evaporation temperature) alarm timeout
0			PM5	Enable solenoid valve closing for MOP protection

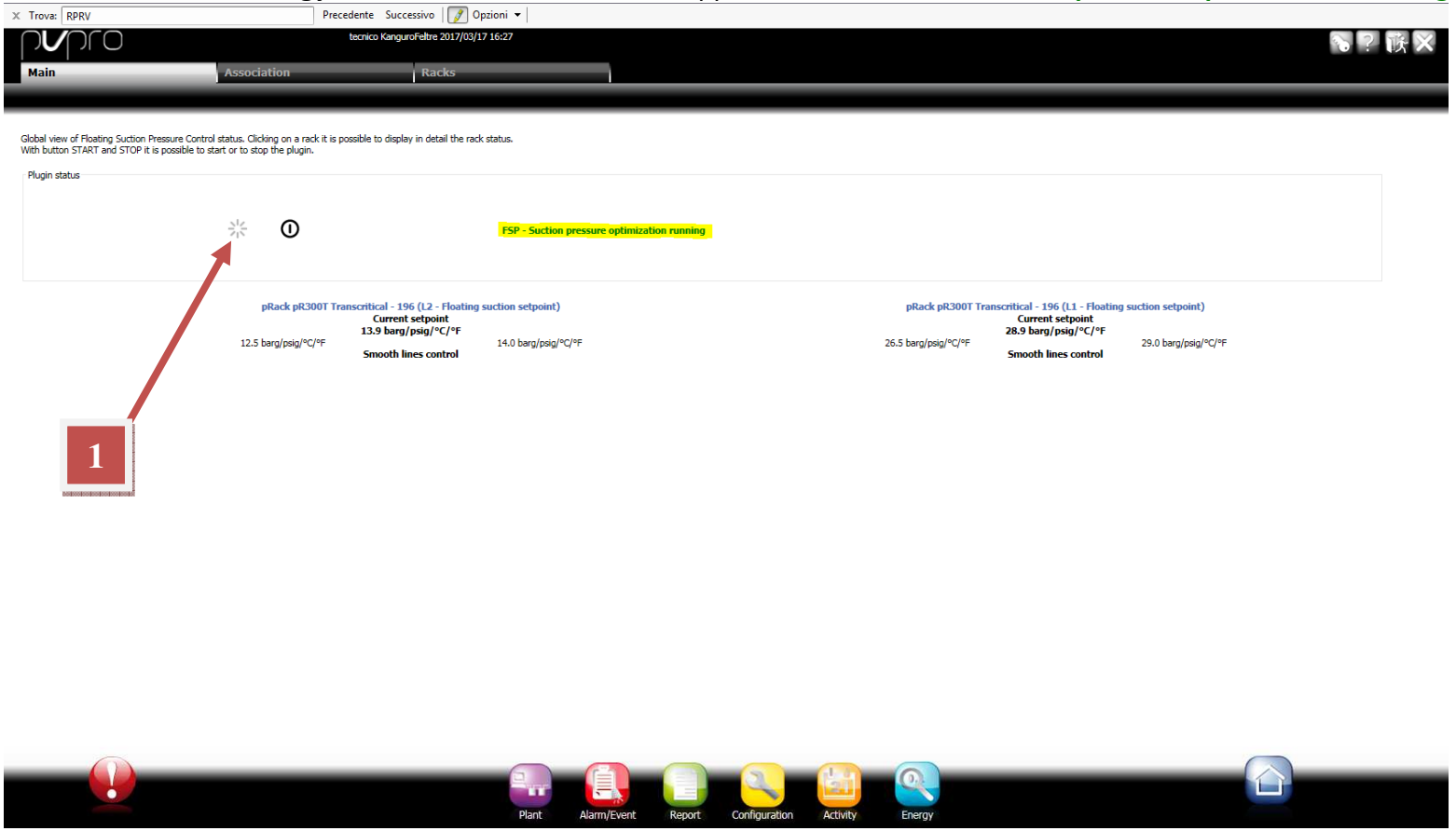
7. In menu **“Energy” → “Floating Suction Pressure”** and enter in **“L2 – Floating suction set point”**



8. On tab **"Parameters"**, flag Set all TSHs to value "1" K and "Save". Repeat for **"L1 – Floating suction set point"**



9. Activate the function in menu **“Energy”**, **tab “Main”.** If is all ok, will appear the tense **“FSP - Suction pressure optimization running”**



FTE 2.0 - COMMISSIONING WITH CAREL SUPERVISOR: IMPLEMENT THE RULES TO INCREASE AND DECREASE SH WHEN HLL IS EXCEEDED

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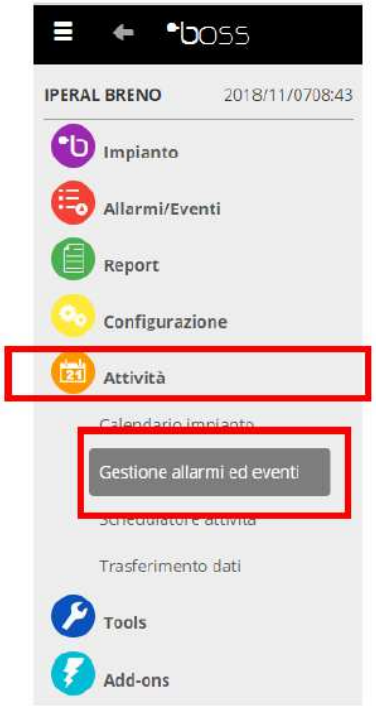
1. CREATE EVENT / RULE / ACTION FOR DECREASE THE SUPERHEAT OF THE MT LOADS

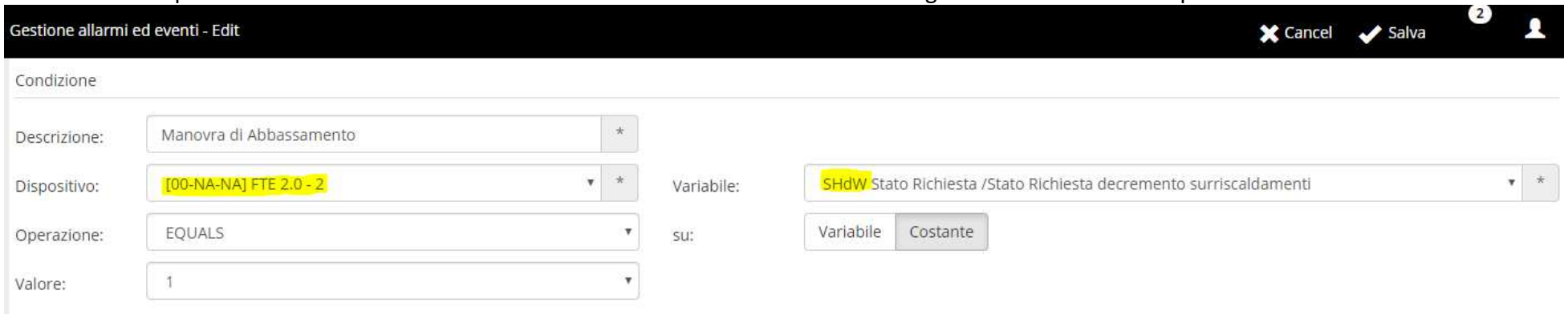
1.1 Create the **EVENT** Manovra Abbassamento:

1.1.1 from the menu "**Activity**" → **"Alarms and events management"**



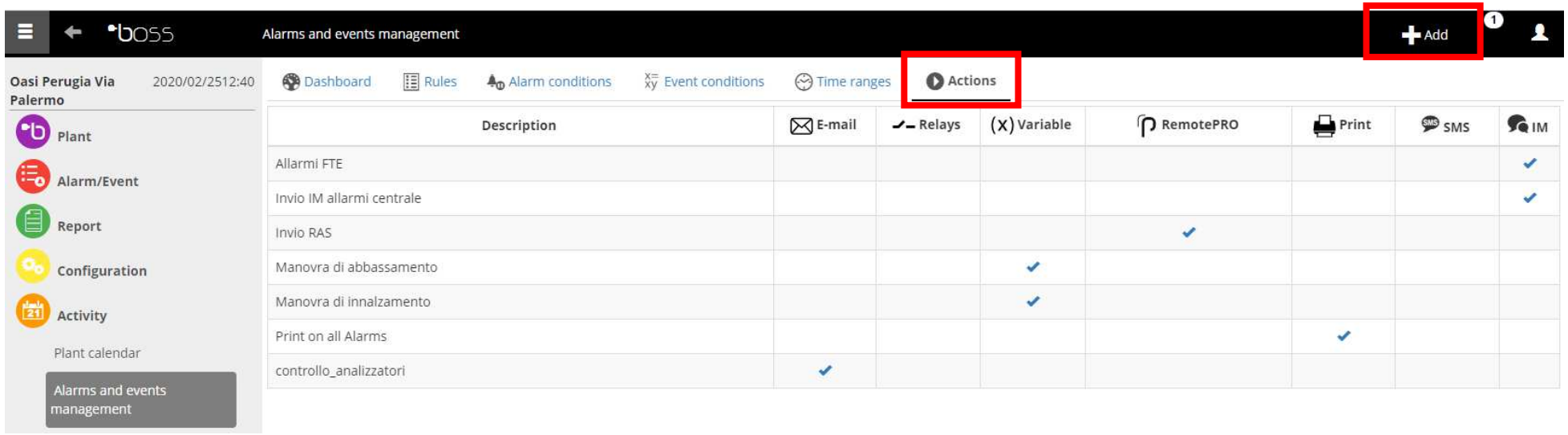
1.1.2 Positioning on tab **"Event conditions"** and click on **"Add"**

1.1.3 Complete the "Event Condition" for DECREASE SUPERHEAT with the following information and description. After click on **"Save"**

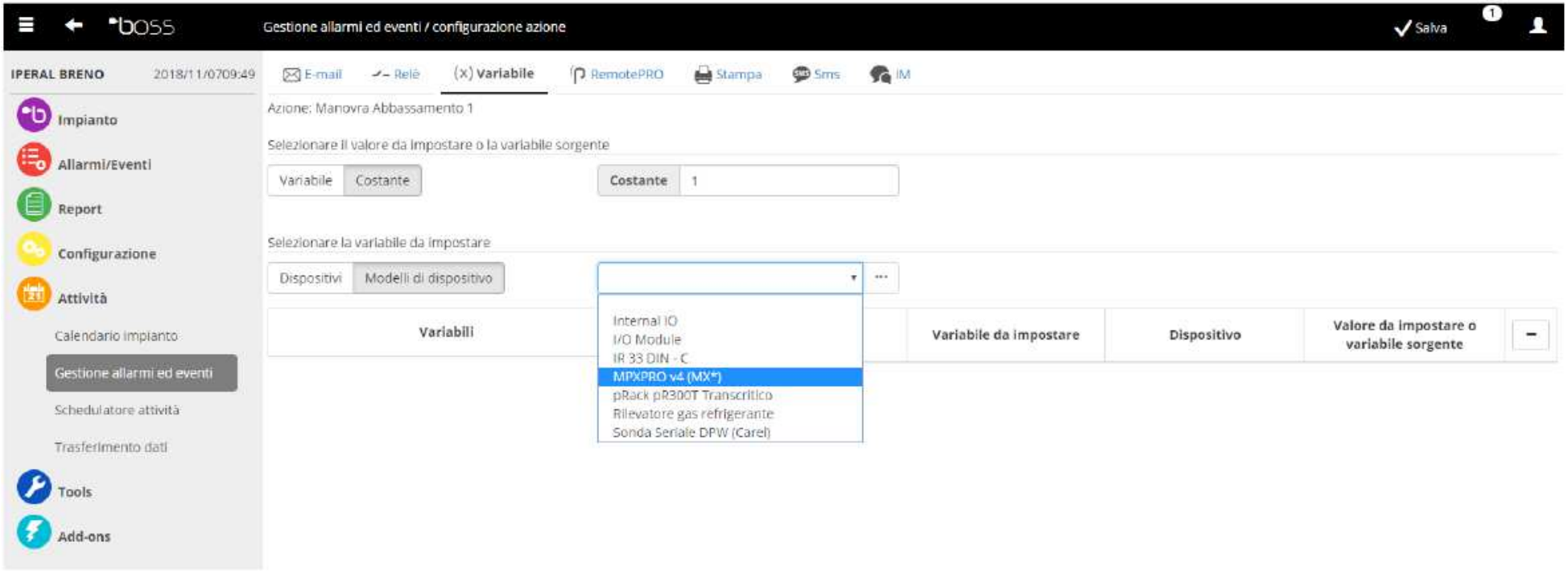


1.2 Create the **ACTION** for DECREASE SUPERHEAT

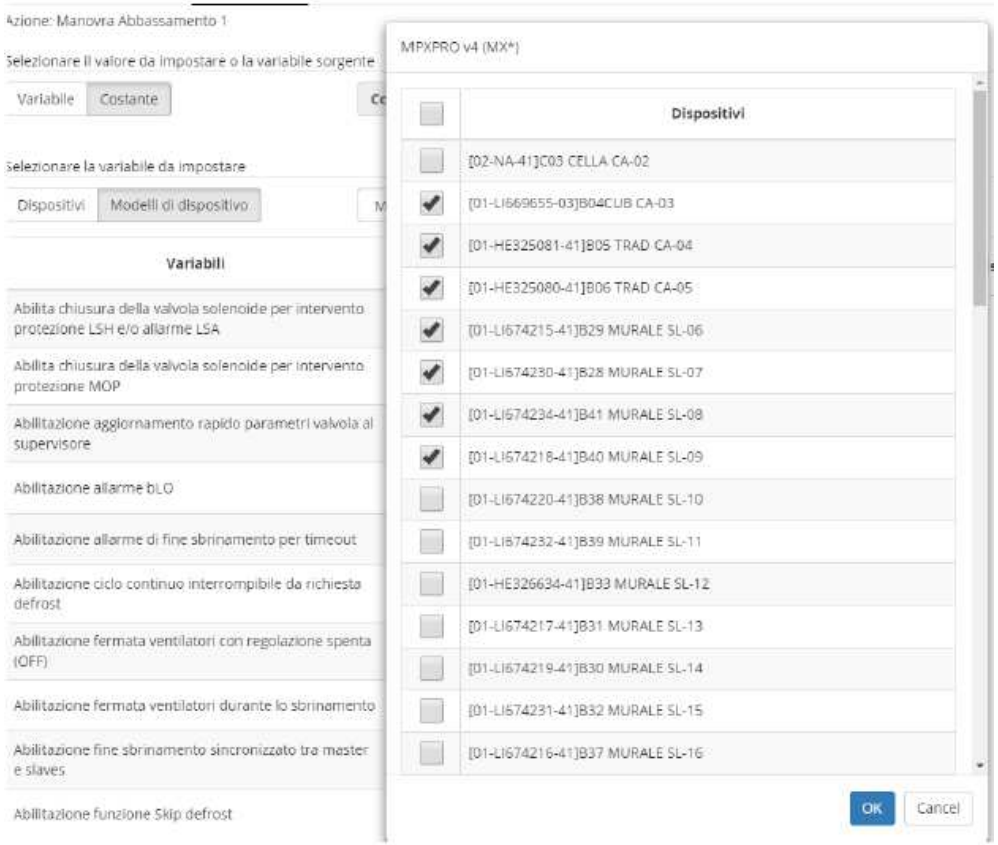
1.2.1 In menu **"Activity / Alarms and events management"** go on tab **"Actions"** and add a new action

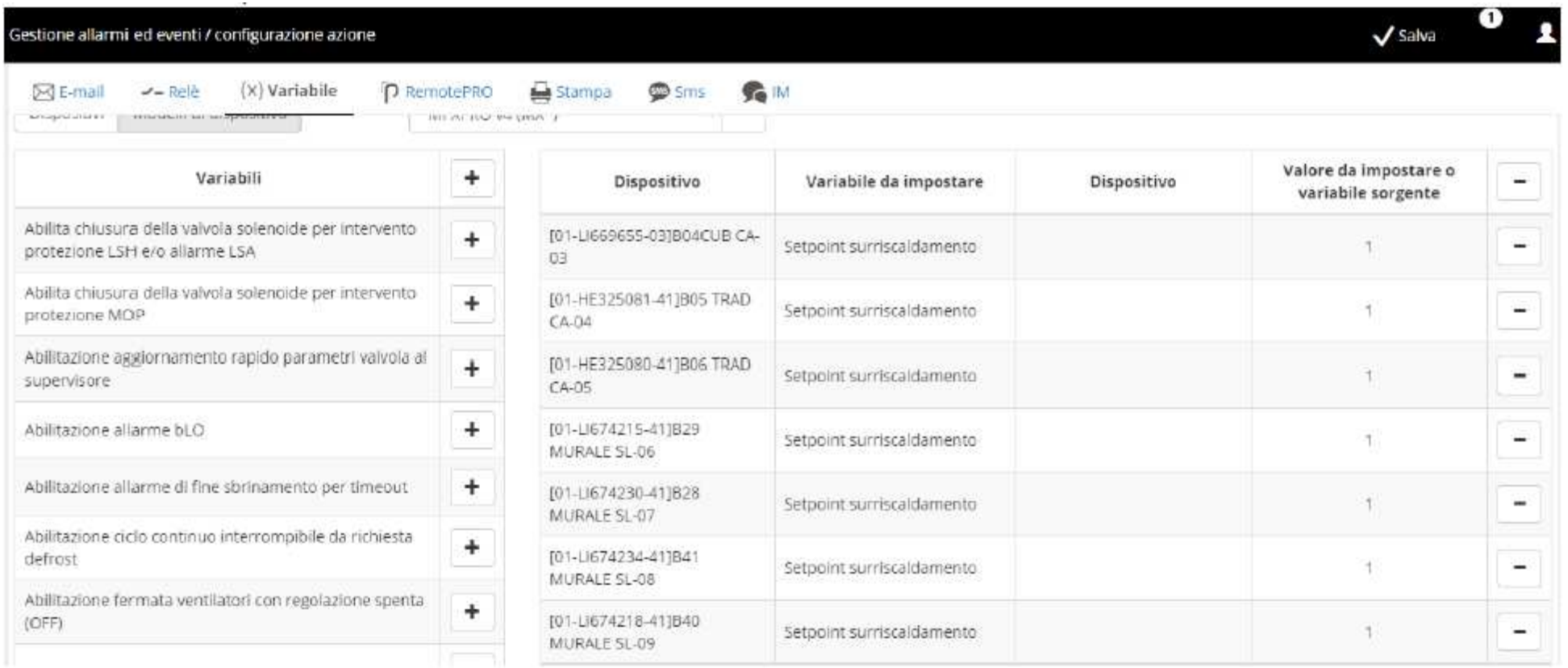


1.2.2 Double click on the new action created. Move on tab **"Variable"**



1.2.3 Selected MT cabinet and change the Variable “Superheating set-point” with the Costant = 1:

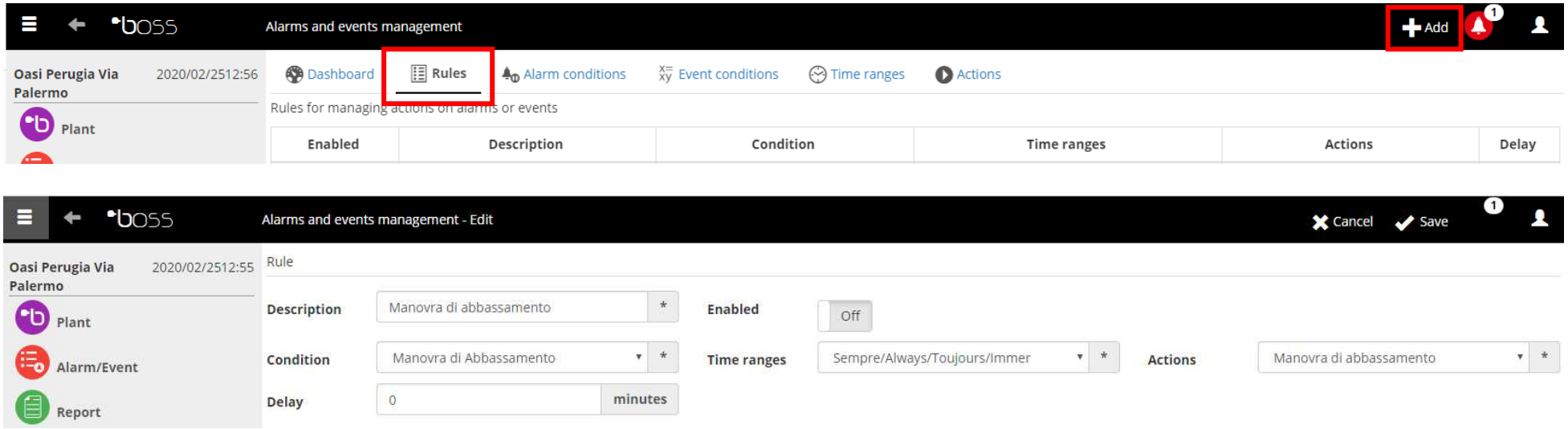




At the end of the operation, when all the cabinet chosen have been inserted **click on "Save"**.

1.3 Create the **RULES** Manovra Abbassamento

1.3.1 From the menu “Activity” and “Alarms and events management”, move on tab **“Rules”** click on **“Add”** e named the rule **“Manovra di Abbassamento”** and complete the Rule with the information as below. “Condition” and “Action” of that rule are the previously named **“Manovra Abbassamento”**



DON’T ENABLE THE RULE

At the end of the operation, click on **“Save”**

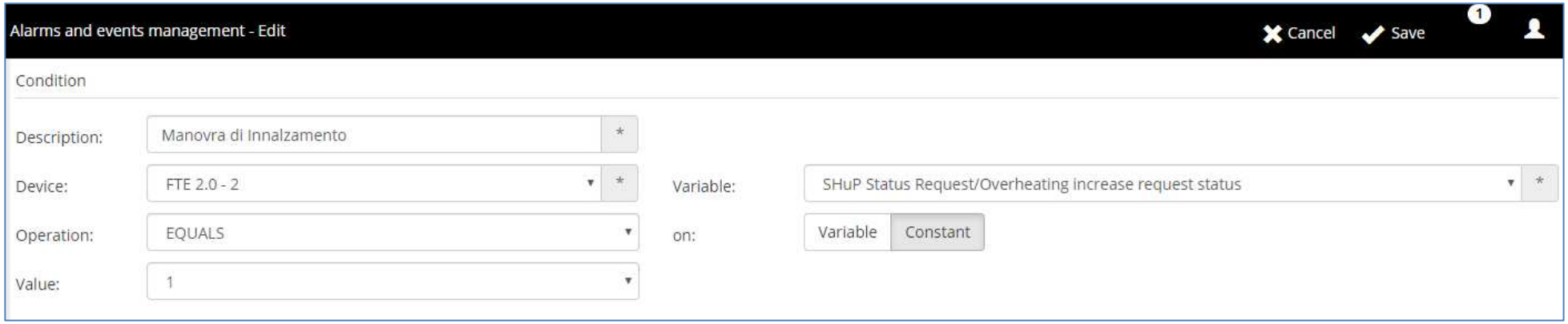
2. CREATE EVENT / RULE / ACTION FOR RAISING THE SUPERHEATING OF THE MT LOADS IDENTIFIED:

2.1 Create the **EVENT** Manovra Innalzamento:

2.1.1 From the menu "**Activity**" → **"Alarms and events management"**

2.1.2 Positioning on tab **"Event conditions"** and click on **"Add"**, name the condition of the event as **"Manovra di Innalzamento**"

2.1.3 Complete the "Event Condition" with the following information and description. After click on **"Save"**



2.2 Create the **ACTION** named Manovra Innalzamento (=Raising Maneuver)

2.2.1 From the menu **"Activity / Alarms and events management"** go on tab **"Actions"**

2.2.2 Click on "Add" and named the action "Manovra Innalzamento":

2.2.3 Double click on the new action created. Move on tab **"Variable"**

2.2.4 For the same previous MT cabinet change the Variable "Superheating set-point" with the Costant = 7
At the end of the operation, when all the cabinet chosen have been inserted **click on "Save"**.

2.3 Create the **RULES** Manovra Innalzamento

2.3.1 From the menu “Activity” and “Alarms and events management”, move on tab **“Rules”** click on **“Add”** e named the rule **“Manovra di Innalzamento”** and complete the Rule with the information as below. “Condition” and “Action” of that rule are the previously named **“Manovra Innalzamento”**.

DON’T ENABLE THE RULE

At the end of the operation, click on **“Save”**

The created rules will be visible in TAB “Dashboard”